

CLAIMS

1. A touch sensitive display device comprising an array of capacitive display element pixels, each display element (16) being associated with a pixel circuit including a pixel storage capacitor (20), each display element (16) being
5 connected at a first terminal (23) to the storage capacitor (20),
wherein the device further comprises one or more common electrode contacts (18a), the or each common electrode contact (18a) being connected to a second terminal of a plurality of the display elements (16), and wherein
10 each common electrode contact (18a) is individually connectable to a charge measurement means (50) for measuring a flow of charge to the common electrode contact (18a).
2. A device as claimed in claim 1, wherein a plurality of common electrode
15 contacts (18a) are provided.
3. A device as claimed in claim 2, wherein each common electrode contact (18a) is connected to a respective charge measurement means (50).
- 20 4. A device as claimed in any preceding claim, wherein the or each charge measurement means (50) comprises a charge sensitive amplifier.
5. A device as claimed in claim 4, wherein each charge sensitive amplifier connects the common electrode contact (18a) to a virtual earth potential.
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6. A device as claimed in any preceding claim, wherein the array of display element pixels is arranged in rows and columns, and wherein each common electrode contact (18a) is connected to the second terminals of the display elements (16) of a plurality of adjacent columns of display element pixels.
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7. A device as claimed in claim 6, wherein each row of display element pixels shares a common row conductor (10) for providing a pixel address

signal, and wherein the storage capacitor (20) of each pixel is connected between the display element (16) and the row conductor of an adjacent row of display element pixels.

5 8. A device as claimed in claim 6, wherein each row of display element pixels shares a common capacitor row conductor (22), and the storage capacitor (20) of each pixel is connected between the display element (16) and the capacitor row conductor (22).

10 9. A device as claimed in claim 7 or 8, wherein a plurality of groups (10a) of adjacent rows are defined with each group individually connectable to a charge measurement means for measuring a flow of charge to the group (10a) of row conductors.

15 10. A device as claimed in any preceding claim, wherein each pixel circuit comprises a transistor (14) which is addressed by a signal on a row conductor (10) associated with a row of display element pixels, and which provides a signal from a column conductor (12) associated with a column of display element pixels to the display element (16).

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11. A device as claimed in any preceding claim, wherein the capacitive display elements comprise liquid crystal display elements.

25 12. A method of detecting a touch input in a touch sensitive display device, the device comprising an array of capacitive display element pixels each comprising a capacitive display element (16) and a pixel storage capacitor (20), the method comprising:

30 applying display signals to the pixels of the array, by charging the display element (16) of each pixel to a desired voltage through a pixel transistor (14);

isolating each pixel by switching off the pixel transistor (14), and storing the voltage on the display element (16) using the pixel storage capacitor (20); and

whilst the pixel is isolated, sensing the charge flowing between the storage capacitor (20) and the capacitive display element (16).

13. A method as claimed in claim 12, wherein the sensing is carried out by monitoring the charge flowing to a terminal of the capacitive display element (16).

14. A method as claimed in claim 13, wherein the charge flowing to a terminal of a plurality of display elements (16) is monitored, the plurality of display elements sharing a common contact (18a) and comprising a column or columns of display elements.

15. A method as claimed in claim 14, wherein the sensing is carried out by also monitoring the charge flowing to a terminal of the pixel storage capacitor (20).

16. A method as claimed in claim 15, wherein the charge flowing to a terminal of a plurality of pixel storage capacitors (20) is monitored, the plurality of pixel storage capacitors sharing a common contact and comprising the pixel storage capacitors of a row or rows of pixels.

17. A method as claimed in any one of claims 12 to 16, wherein a subset of the pixels of the array are used for touch sensing and display, the remaining pixels being used only for display.

18. A method as claimed in claim 17, wherein substantially static images are provided to the subset of pixels.

19. A method as claimed in claim 17 or 18, wherein the subset comprises a plurality of rows of pixels.

20. A method as claimed in claim 17, wherein the display data for the
5 subset is repeated, and touch sensing is performed in the first or in a subsequent repetition.

21. A method as claimed in claim 20, wherein the subset is different for different frames.